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The Integration of Preventive and Curative Medicine in Health Insurance

I.

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THE subject under discussion is the closer relationship of the preventive and curative branches of medical service and the changes which may be required to make them most effective under health insurance.

The Canadian Medical Association welcomes this opportunity of presenting its views for two reasons: first, to show its appreciation of the great importance of preventive measures in the care of the public; and, second, to give added proof of the fact that as a profession the preventive and curative branches are united in the desire to provide a better health service for the people.

Development of Public Health Work

From the historical point of view, public health may be said to have taken on a new tone shortly before the beginning of the last war. While environmental measures such as water supplies, sewage disposal, light and air supplies had received some attention for many years, it was only in the earlier years of this century that public-health authorities became interested in the communal care of the individual, with the introduction of special services regarding maternal welfare, the care of infants, of children in schools, etc.

"Unfortunately," as Viscount Dawson of Penn (1) says, "although all credit

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should be given to the founders of communal health services, they tended to rear these services in bureaucratic isolationism. They did not secure the active participation of the whole profession. The fault was not entirely theirs. It lay in equal measure with the Royal Colleges, the teaching hospitals and their staffs. Their minds were held within the ancient confines of curative medicine and were blind to the enlarging opportunities opening out before them. The result was a gulf fixed between preventive and curative medicine which has now to be bridged."

While this was true in Great Britain, I do not believe it was ever so sharply defined on this side of the water. While the two branches may have been separated at certain points, still they have maintained a considerable degree of contact; but if the health of the public is to be more fully served, there should be even greater collaboration in the future should health insurance be introduced.

We have defined our attitude to health-insurance legislation in the following resolutions:

1. That the Canadian Medical Association approved the principle of health insurance.

2. That the Canadian Medical Association favours a plan of health insurance which will secure the development and provision of the highest standard of medical services, preventive and curative, if such a plan be fair both to the insured and to all those rendering the services.

Our Association stated before the Special Committee on Social Security (2) that one of the objects of the Association is to promote the public health, and that "The purpose of this submission is:

1. To emphasize that adequate medical care is essential to the welfare of Canada.

2. To review certain factors which handicap the medical profession in providing adequate medical care.

3. To point out that highly desirable preventive and public-health services are now inadequate."

Health should be regarded not in the negative sense of the absence of disease, but as a positive matter. In any plan of social security due recognition should be given to improved employment, improved housing, nutrition and physical fitness if a well-balanced plan of health service is to be evolved.

Our Emphasis on Curative Medical Services

While we believe that the provision of curative medical care for all should be an important part of health insurance, we are not unmindful of the importance of preventive medicine. In our brief is noted the fact that many highly desirable preventive and public-health services are not being provided because of the lack of sufficient funds. "It is unfortunate that while in the past money has been freely available for so many other purposes, yet so much difficulty has been encountered in obtaining adequate funds for effective programs of preventive work and public education on health matters."

In the succeeding pages of the brief are developed our ideas regarding the

role of preventive medicine. The family doctor going in and out of the home should be the first line of defence. He should be responsible for a wider use of protective inoculation and vaccination. His activities in the important fields of hygiene, sanitation, periodic health examination, maternal welfare, and the correction of children's defects both mental and physical, are all emphasized. A more vigorous attack by the profession on the problems of cancer, tuberculosis and venereal disease is advocated.

Both the Public Health and Canadian Medical Associations are therefore in complete accord regarding the necessity of increased activity in the preventive field by all concerned in the provision of health service.

The Canadian Medical Association, however, does not support the administration of the Health Act by a government department. While we agree that the contact with ultimate authority, Parliament, should be through the Minister of Health, we feel that in the Provinces the administration should be by means of an independent corporate body or commission. We fear the vicissitudes of political life and wish administration to be removed from that turbulent arena.

The Family Physician in Preventive Medicine

While there is general agreement that the successful operation of the plan will depend largely on the family doctor, there has been more abstract than objective thinking as to how his services can best be used in the preventive field. The answer probably lies in greater co-operation between the practising physician and the public-health service. It will mean adjustment on both sides, a change in the point of view.

Under the present methods of practice the family physician thinks of his patients mainly as individuals, whilst the public-health department deals with the population in groups.

The physician tends to preserve the individual contact. So many of his professional problems are personal ones: the idea of professional secrecy is deeply rooted. While open confession is known to be good for the soul, the patient is a long way from desiring public discussion of his troubles by his physician. Publicity is therefore abhorrent to the family doctor; he is a dead loss to the press.

On the other hand, departments of health quite rightly have no qualms about publicity. They use it freely. They welcome press notices of their work and rely on these notices to educate the public to expect and demand services which will raise the standard of health. They use publicity to break down popular resistance, because, after all, John Citizen does not welcome sudden changes in his mode of life. An excellent example of this was reported in the *British Medical Journal* under the title of "Demolitionitis during the London Blitz". This did not mean a nervous reaction to the horrors of the blitz but rather the mental upset which followed the removal of slum dwellers from their familiar but ruined surroundings to relatively ideal homes, where there were good plumbing and plenty of light and air, but where there were none of

the old associations and social amenities such as the corner "pub". It was a good example of the effects of sudden change without adequate public education.

Again, public health has depended a good deal upon team-work while the conditions of private practice have tended to accentuate the individualistic side of the physician, and to produce professional isolation which the general practitioner himself is the first to deplore. This, of course, does not hold with regard to his position in the community. The family physician usually heads the list in any local endeavour and his influence is always on the side of progress; but the irregularity of working conditions makes for sporadic rather than continuous effort in this regard. He is compelled to give 24-hour service, 7 days a week, often 365 days in the year. No wonder then that his efforts may appear slow in getting results as compared with the full-time office man with a staff to take much of the bounce out of emergency calls.

Co-operation is the Solution

How then are we to integrate these two services so that the desirable features of each may be most usefully employed? Team-work is the answer. Medical research produces the material, public-health services should popularize it, the physician should apply it. If education in the value of health is to be deeply impressed upon the public, the family doctor who comes into the closest contact with the people must of necessity be an important public-health teacher. This will require a keener consciousness of the place of preventive medicine on the part of those in practice.

Certain changes will be required to make use of this latent force. It has often been thought that departments of health have tended to invade the clinical field, but under the proposed system they would make a fuller use of the services of the family doctor. It is suggested that there should be a more general use of the organization of the health department to prepare the work of the practitioner. A logical point of contact between the two would be the public-health nurse, or perhaps better called the health nurse. Her services could be employed in gathering groups for inoculation, for well-baby clinics, for antenatal and postnatal examination, thus saving the doctor's time and making sure that the ground was adequately covered. The arrangement of this service would be an important factor in the successful operation of the plan.

One would also foresee in the wider use of the small hospital a very definite point of contact between the public-health official and the practitioner. Many of us have forgotten that the days of the horse-and-buggy doctor have gone. In those days the patient could be seen at his home or even by the roadside almost as well as at the doctor's office or the hospital. This is all changed. Medical science uses many instrumental and mechanical aids and these cannot be carried about the countryside. The logical place for the examination of all except the bedfast sick is in the well-equipped doctor's office or hospital. The patient should come or be brought there. This is the practice in many communities at present. We hear of nine-tenths of all maternity work being done in the community hospital. Such hospitals, suitably located and equipped according

to local needs, would do much to give the country doctor the tools and opportunities to practise the type of medicine which he has been taught in the medical school. They would abolish his feeling of isolation and frustration. They would be the logical place for the health nurse's office and would afford an opportunity for personal contact between the district medical officer of health and the local practitioner. It has been this impersonal and very intermittent contact between the health department office staff and the general body of practitioners that has been the cause of many of their misunderstandings and jealousies in the past.

Such a plan would require a considerable increase in the resources of the medical services, both personal and financial. It presupposes a larger use of the nurse with public-health training, not only in the type of work which is now done, but in a new role of part-time assistant of the local doctor. It assumes a considerable increase in the number of full-time officers of health serving large enough districts to make their employment an economical one. It envisages a new type of practitioner, one who from his college days has been made fully conscious of the needs of social medicine, who will make full use of the facilities which are available, and who will look forward to general practice as an opportunity to make use of the skills which he has learned at medical school, rather than the restricted field which at present is all that is open to those who practise without a hospital connection.

Under such conditions many of the disadvantages of rural practice would be removed, and with adequate remuneration, suitable facilities for practice and contact with the medicine of larger centres there would be a reversal of the present trend of practitioners towards the towns and cities away from the country.

To provide this added professional staff would require a definite expansion of our medical schools and schools of nursing. Our wartime acceleration of courses has proved to be an unsatisfactory plan, and it may be necessary to increase the number of medical schools and training schools for nurses. This is a point which should be kept in mind by those who are drafting the legislation. At present they do not seem to have realized that if we are to have the required number of doctors and nurses to operate the plan, grants in aid of general medical and nursing education are just as necessary as are grants for postgraduate instruction in public health.

Conclusions

If, then, we are to have a proper integration of preventive and curative services under health insurance, four things are essential:

1. A clearer understanding of the aims and methods of the public-health branch by the general practitioner, and a similar understanding by the health officer of the difficulties and differences in methods of private practice. However, we are all physicians, whether internists, public-health officers, or general practitioners; we have one common aim, the prevention and cure of disease.

2. More frequent meetings of all those concerned in the provision of health

services both curative and preventive, so that they may know each other as persons rather than as officials.

3. Planned co-operation between the two branches so that the best results can be attained.

4. Further education of the public so that they will recognize the necessity of co-operating with the health services if these services are to reach the highest degree of efficiency.

REFERENCES

(1) Dawson, Viscount: *Brit. M. J.*, 1942, *1*: 573.
(2) Minutes of Proceedings and Evidence: Special Committee on Social Security, Vol. 5, April 22, 1943.

The Integration of Preventive and Curative Medicine in Health Insurance

II.

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DURING the past few months, all of us have watched with a great deal of interest the proceedings of the Special Committee on Social Security of the House of Commons at Ottawa. Many sittings of the Committee were devoted to consideration of that subject most vital to us and to all Canadians, health insurance. It would appear that at last an opportunity is to be given us as health workers to bring to fruition many of the long-overdue preventive programs which are so essential to the well-being of this Dominion.

In order to approach properly the subject being presented to-day, it is essential that we understand what is meant by the term "health insurance." To many lay individuals, health insurance implies prepayment for medical care, and very little thought is given by the public to other phases of the proposed legislation. To the medical and other professions who are going to provide the service, health insurance means a plan whereby every person, regardless of economic status, can ask for and obtain medical service as and when he requires it, and whereby those who provide such service will receive adequate remuneration. However, all of us in the health field look on health insurance as something entirely different from this, and believe that its implications are far more than the mere provision of medical care for persons who require it.

Health insurance is exactly what the words imply: a scheme to provide, in the first instance, services whereby people may be kept healthy and disease and

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suffering and death be prevented; and secondly, medical care as and when required.

Proof that this attitude of public-health officials is the correct one is found in the proposed legislation itself. Section 3 of the Federal Draft Bill states that in no case shall the Dominion Government make an agreement with any province unless the province has made statutory provision for utilizing both the "Health Insurance Grant" and the "Public Health Grant" (for preventive services). Section 5 states that the provincial legislation shall include services and activities as set forth in the Third Schedule of the Act; and the first item of this Third Schedule relates to public health. Again, in a discussion on benefits in the proposed legislation to be enacted by the Provinces, paragraph 27 of the Second Schedule states that the benefits conferred by this Act on qualified persons shall be such as to provide, firstly, for the prevention of disease, and, secondly, for the application of all necessary diagnostic and curative procedures and treatment. Again, paragraph 28 specifically requires that the regulations shall provide that the beneficiaries under the Act (qualified persons), shall receive from medical practitioners all such adequate measures for the prevention of disease, and all such necessary and adequate medical, surgical and obstetrical treatment, etc., as may be prescribed. In other words, everywhere in the Act, where anything is mentioned in respect to the provision of services, the first and foremost consideration is the prevention of disease and the promotion of health.

Again, if we look at the whole program of social security as presented by the Minister of Pensions and National Health, we find, as a corollary to the health-insurance proposal, legislation for a physical-fitness program for young people. These two projects alone are evidence that public opinion considers that our present methods of taking care of the health of our people are inadequate.

The responsibility for integrating measures of disease prevention and health preservation into any plan for the improvement of the well-being of our people will rest primarily with the official and non-official health agencies. Already this problem has been given considerable study by the official health agencies, and briefs have been presented to the Special Committee on Social Security which set forth admirably the best means for carrying out the intentions of the suggested legislation.

The Canadian Public Health Association states:

"1. That preventive medical services are essential to the success of health insurance.

"2. That the practising physician should provide both preventive and treatment services; and that to render these services, he must have assistance from an adequate local department of health.

"3. That all parts of Canada must have adequate local health services.

"4. That adequate local health-department services depend on provincial departments for direction and for financial assistance.

"5. That grants-in-aid from the Federal Government offer the solution for meeting urgent public-health problems, particularly the control of tuberculosis, treatment of mental illness, and control of venereal disease, and the development of adequate local health-department services to cover all parts of Canada.

"6. That it is essential that health insurance and public health be integrated both in provincial and local administration.

"7. That qualified public-health personnel are required in the conduct of public-health work, and provision for assisting in their training is necessary.

"8. That more adequate support of medical research in Canada is essential to the progress of medicine and the success of health insurance."

The Canadian Medical Association in its submission, realizing the necessity for a great expansion in the provision of preventive medical services required for the well-being of Canadian citizens, states in part as follows:

"Such a general program would greatly assist in the fight to eliminate certain diseases such as diphtheria, whooping cough, tuberculosis, rickets, typhoid fever and smallpox, and would assist in the reduction in the frequency of many others, such as certain forms of mental disease, rheumatic heart disease, goitre, venereal disease and cancer.

"As years pass, the cost of curative services might be expected to materially decrease as disease is controlled and physical fitness increased."

At the request of the Special Committee, the chief executive health officers of the various provinces prepared, on very short notice, a submission representing the opinion of the technical heads of the Provincial Health Departments of the nine Provinces. The method of administration and the place and duties of the "medical adviser" (the family doctor) in respect to preventive medicine in a health insurance plan were set forth.

This implied that, at least at the beginning of any plan, the chief responsibility for preventive medicine would rest with the medical adviser, aided by proper consultative services made available to him by organized public-health departments. His duties would include the provision of adequate pre-natal, natal, and post-natal care for pregnant women; the supervision of the health of children in the pre-school age group, with all necessary immunization procedures; and regular complete physical examinations with appropriate medical attention where indicated. Before any child was allowed to go to school, it would be necessary for the physician to supply the school authorities with a completed examination form, showing exactly the child's physical status. It was thought that, for the present at least, the family physician's responsibilities in the field of preventive medicine for children under the health-insurance plan would, to a large extent, end at the time the child entered school. Briefly then, we believe that the medical adviser must be responsible for the health supervision and medical care of a child from the time of its conception until it is of school age.

Health officials will wonder whether we can be assured that the services outlined will be carried out by the general practitioner. Personally, I have complete confidence that organized medicine will lend every effort to carry out successfully all provisions for preventive medicine that may be contained in any plan for health insurance. In the matter of control, if the medical adviser is to be paid a capitation fee, it will be a simple administrative procedure to allot a definite percentage of the fee for the preventive services outlined and withhold such payment until the local health authority is satisfied that the work has been completed.

We believe that when a child reaches school age, his health during school

life can be more economically supervised and protected by an official health agency through an adequate school health program than by private physicians. A higher and more uniform standard of preventive services can thus be rendered to the children in this age group because those providing the services will have had special training in this field of preventive medicine.

As health insurance becomes a reality, with emphasis on health preservation, ultimately every person providing services under the plan will become a health educator, and practise preventive medicine. This work will not be left to the general practitioner and to official health agencies alone, but hospitals, nurses, specialists, and even surgeons will become "health-minded," and will be concerned not only with the diagnosis and treatment of illness, but also will consider ways and means of preventing it.

There are many groups in our communities, particularly those in the rural parts of Western Canada, who because they have not had in the past few years a reasonable standard of medical care, have been considering health insurance, state medicine, and other ways by which they may obtain necessary health services. Most organizations usually arrive at the conclusion that the care of illness in itself is only a minor part of any health-insurance scheme. I had the privilege this summer of addressing public meetings on health insurance which were sponsored by the Women's Institute in practically every part of the province of Manitoba. At every meeting the emphasis of the discussion rested on the prevention of disease and the preservation of health rather than on the care of illness.

We cannot discuss the integration of preventive service in health insurance without going back to some of the fundamental features of the proposed legislation, and to my mind the most important of these is the matter of provincial administration. As you all know, while administration by the Federal authority is under the Department of Pensions and National Health, the proposal recommends that administration in the Province should be by a commission. It is doubtful that hard-and-fast rules laid down in this connection in the proposed Draft Bill will meet with the approval of all the Provinces, and it would seem, at least in some of the smaller ones, highly desirable that health insurance and public health should be under one and the same administration. Everyone will agree that if preventive services are to be successfully integrated in the scheme of health insurance, there must be the closest relationship between organized medicine and organized public health.

My own opinion is—and I voice the opinion of all the other executive health officers of the various provinces—that the administration of health insurance cannot be divorced from the administration of public health, and any required administrative set-up in this connection must be directly under the Ministers of Health of the various provinces. Whatever the set-up, whether as a division of the Department of Health or as a small commission responsible to the Minister of Health, it would seem to be essential to the proper functioning of the plan that there be an advisory committee to the health authority, consisting of representatives of all groups connected with the plan.

The Canadian Association of Social Workers, in their Brief to the Special Committee on Social Security of the House of Commons, stated in part as follows:

"Provincial administration is placed in the hands of a commission. A large amount of important administrative work is to be done at the provincial level, and we believe that such a body would be somewhat unwieldy and ineffective for this purpose. As an alternative, we believe that the proposal of the Deputy Ministers of Health is sounder; namely, that provincial administration should be through a Director of Health Insurance in the Department of Health, or else by a three-man commission. In either case, there should be created a representative Provincial Advisory Council, available to the Director or the Commission for reference and consultation. This Council should provide for wide representation of laymen, who are, after all, the ultimate consumers of the services offered by a health insurance program."

A further responsibility and duty on the part of organized medicine and official health agencies is to take more interest in the teaching of disease prevention and health preservation in our medical schools. In my opinion, no Faculty of Medicine in Canada gives an undergraduate course with sufficient emphasis on the importance of public health and preventive medicine. When medical education is properly planned to inculcate in the student a realization of the tremendous possibilities and responsibilities of preventive medicine, then, and then only, will proper emphasis be placed on that part of medical practice which ultimately will promote a healthier, happier generation of Canadians.

None of us can foretell what may be presented to the House of Commons at Ottawa as legislation on health insurance following consideration of the proposals advanced by the Advisory Committee under Dr. J. J. Heagerty, but we all earnestly hope that preventive medicine will remain the keystone of any health insurance plan, and it is our responsibility to direct all efforts to this end.

In the midst of war we must plan for peace, and I would suggest to you that there are many things outside the strict confines of the science of medicine that adversely affect the mental and physical well-being of our people. Unemployment, either actual or because of illness; bad housing, unsatisfactory sanitation, and inadequate education may all be listed under a single term—social insecurity. All of us, therefore, must take the deepest interest, both as citizens and as the guardians of Canada's health, in all proposals of governments or other groups for social security. We, with our intimate knowledge of conditions affecting the health and welfare of our people in all the provinces of the Dominion, must, if we are to serve our country as we should, take a leading part in all plans for that better world which we hope will be ours when the war ends and Canada returns to her peacetime pursuits.

Recent Advances in Tuberculosis Control

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IN war, as is all too vivid in the memory of everyone present, scientific changes wrought by invention in years, and even months, render tried and trusted tools obsolete and may shift effective attack from land to sea, or sea to air. Yet the fundamental strategy, such as swiftness, surprise, attack and counter-attack, has altered little since ancient times. So in the campaign against that eternal, ubiquitous infectious enemy, tuberculosis, there are factors changing rapidly and fundamental principles of strategy which have not altered since the days of Robert Koch. Science and invention have provided new and better equipment for the discovery and treatment of the disease: the stethoscope, the microscope, culture media, tuberculin, the X-ray, the photofluorograph for discovery; rest from work, bed rest, temporary lung rest, permanent surgical collapse, surgical resection and pulmonectomy for treatment. But the fundamental strategy of control and eradication of this obstinate and most adaptable of infectious diseases remains unchanged. This consists of early discovery, segregation of the infectious host, and increased resistance of the unavoidably exposed, in every way possible—the common strategy of all infectious diseases.

I need not tell public-health workers that little progress has been made in the control of certain acute infectious diseases for which we have no prophylactic, such as measles and mumps, but our experience with tuberculosis during the past generation has shown this disease to be entirely different. Steady progress is being made in its control without a prophylactic where isolation for treatment is being applied.

There are certain important differences between tuberculosis and other respiratory diseases which make it more responsive to isolation. Acute respiratory diseases are almost always accompanied by infectious rhinitis and sore throat, and such cases are without exception infectious. On the other hand, in 75 per cent or more of persons who become infected with tuberculosis there is a small area of lung affected which resolves without rupturing to the surface and becoming infectious. Moreover, acute respiratory diseases depend for their spread on many cases being infectious for a short period, whereas tuberculosis depends upon a few cases being infectious for a long period. Tuberculosis is a much more slowly developing infection. There is much more time to isolate before the seeds are shed.

Health workers may desire to know the early results of this thesis translated into practice. I shall endeavour to set them forth briefly:

One of a series of papers outlining recent contributions to knowledge in the various fields of public health, presented at the wartime conference and thirty-second annual meeting of the Canadian Public Health Association, held in the Royal York Hotel, Toronto, on October 4 and 5, 1943.

(1) Where an active program is pursued and the tuberculous sick are promptly admitted for treatment, and contacts and ex-patients are followed, it has been found that only a small residuum of unknown spreaders remains among the so-called well public. In Saskatchewan, with a tuberculosis death rate among the non-Indian population of approximately 20 per 100,000, the unknown spreaders found in all age groups in 100,000 people was one per thousand. Under a similar program, but with varying death rates, the unknown spreaders might be expected to vary with the death rate. This finding is significant; where the death rate is low and the program active, the incidence of unknown infectors is very low.

(2) Where active segregation for treatment has been pursued, the infection incidence goes down rapidly. Examination of the Normal School pupils in Saskatchewan in 1921 and again in 1941 showed that the incidence of infection indicated by the tuberculin test had fallen from 75 per cent to 15 per cent.

This experience would not be convincing if it did not obtain in congested centres of population. In the City of Saskatoon the testing of a cross-section of school children has shown that the incidence has fallen from 53 per cent in 1921 to 14 per cent in 1934, and to 7 per cent in the cities of Weyburn and Moose Jaw in 1937. In Saskatoon the evidence among preschool children, derived from tuberculin-testing new entrants to school (nearest age six years), reported by Dr. G. Binning, School Health Officer, shows that in 1936 among 348 entrants 3.16 per cent were positive to tuberculin, and in the same city in 1942 among 340 entrants only one positive reactor was found—less than one-third of one per cent. This evidence tends to show that tuberculosis is an infectious disease that may be reduced to a minor cause of death by the elimination of infection.

(3) Segregation of the disease for treatment is the method proved to be effective in the elimination of infection. Beds for treatment are still the greatest need in the campaign against tuberculosis in Canada. Several provinces are short of beds to segregate and treat new civilian cases discovered. Then, too, the time is approaching when the army will be demobilized. Health authorities had the experience of the last war as a warning, and they have had plenty of time for preparation. Accommodation should be provided now for tuberculosis casualties from the Forces.

(4) A word now about the protection of the unavoidably exposed. The protection of staffs, particularly nurses in general hospitals, mental hospitals and sanatoria, against tuberculosis is a responsibility that rests upon all health workers and particularly on tuberculosis workers. This was an increasing problem in Saskatchewan until recently, notwithstanding new and improved nurses' homes, better food supervised by dietitians, and better training in infectious technique.

Dr. Brink's summarized findings in Ontario showed the incidence of active lesions discovered in the period 1937, 1938 and 1939 among nurses in sanatoria to be 1.47 per cent per annum, and among nurses in general and Red Cross

hospitals to be 0.54 per cent per annum. The problem is acute wherever the incidence of infection is falling.

In the five-year period 1934-1938 in the three sanatoria of Saskatchewan twenty persons among employees entering the service with negative tuberculin tests developed lesions, and two lesions developed among employees entering the service with a positive test. During the past four and a half years, in which time all negative reactors have been vaccinated with B.C.G. vaccine, only three persons from these institutions have developed lesions. Eighteen hundred nurses in training, and exposed hospital and sanatoria employees in Saskatchewan have been vaccinated since March 1938; in all, including the three mentioned above, ten persons so vaccinated have developed lesions. A provisional report will be made in 1944 on prophylactic vaccination, after five years' experience.

Experience in the vaccination of 432 Indian babies during the past ten years has shown a reduction in the mortality of 75 per cent among vaccinated compared with the controls. This experience tends to confirm the statement of Calmette twenty years ago that B.C.G. was a vaccine affording protection which would reduce mortality by 75 per cent among babies.

Interest in vaccination has been increased by animal experimentation being done with the vole acid-fast bacillus at the Banting Institute. The result of this work as reported by Irwin and O'Connell[1] is very encouraging.

(5) The spread of tuberculosis depends upon a few cases being infective for a long period. The problem where a selective case-finding program has already been established is the economical discovery of the unknown spreaders. Until recently this problem has defied solution. The invention of the photofluorographic film has provided a means whereby miniature films can be made available in mass surveys at a cost, including the salary of doctors and technical staff, of fifteen to twenty cents per person. That is a cost of $20,000.00 for the examination of 100,000 people. These films are satisfactory for the selection of definite tuberculous cases. Persons so selected can be further investigated clinically and radiologically.

The cheapness of this method of discovering unknown spreaders removes at last the financial barrier to case finding, and opens the way for a great advance in the eradication of tuberculosis. There is no city or municipality, small or large, that cannot raise voluntarily the cost of such a survey. It can be raised through the usual medium of Christmas Seals.

The active phase of tuberculosis prevention is at hand. A province or state can be examined every five or ten years in accordance with the desire to get rid of tuberculosis.

Photofluorographic surveys do not replace clinical, radiographic and laboratory clinics. These clinics proceed as usual, but loaded up with the responsibility of examining, observing and disposing of the residuum of unknown cases discovered by the wider net. They will service communities made much more thoroughly tuberculosis-conscious because they have organized for co-operation

[1]Irwin, D., and O'Connell, D. C.: Vole Acid-fast Bacillus Vaccination in Experimental Tuberculosis. *Canad. M.A.J.*, 1943, *48*: 486.

in one of the most difficult feats in health work, the examination of every individual in the community.

In the progress of the reduction of infection in a community or province a stage is reached when it is opportune to alter the objective of the attack from a control to an eradication program. As long as tuberculosis infection is universal among the young adults in a community and apparently inescapable, segregation for treatment may be considered largely as curative and cannot be featured as a major preventive attack on the spread of the disease. Under such conditions, removal of aggravating secondary causes which reduce resistance to disease are first-rate, indirect preventive measures applying to the entire population. On the other hand, at the time when infection falls to the point where it is partial only among the young adult population and infection is evidently escapable, then a direct attack on infection through segregation for treatment further reduces the level of infection and increases the chance of escape and becomes a highly effective measure of prevention in the protection of the uninfected.

Removal of aggravating secondary causes then becomes operable only in the case of those who have been already infected and is only a partially applicable preventive measure.

Finally, when the minority only are infected in young adult life, segregation becomes the major preventive measure protecting the majority who are uninfected, and removal of secondary aggravating causes becomes the minor preventive measure assisting in the protection of the infected minority.

At this juncture the time is opportune for the institution of the eradication program. In this latter phase of an anti-tuberculosis campaign emphasis should be focused and money spent on segregation and the elimination of infection. In other words, the slogan should be the eradication of tuberculosis by early discovery of spreaders and by segregation. The people should no longer be led to believe that they can secure adequate protection by removal of aggravating causes such as poor living conditions, epidemics and other secondary predisposing causes, but they should be encouraged to demand also the more adequate protection resulting from the elimination of infection.

In health work, as in agriculture, methods of eradication vary in accordance with the prevalence and noxiousness of weeds. The people of Canada know that tuberculosis is a bad weed, a perennial that sheds its seeds from year to year. When these weeds or cases are sparse, the best practice is to find them and remove them before the seeds are shed. To do this, everyone must learn to identify tuberculosis in the seed, in the sprout, in the flower, or in the ripe shelling. This is why preventive education should be pursued as never before in the schools, in the Normal Schools, in families and communities, and throughout Canada generally.

Recent Advances in Child Hygiene

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SINCE good health is a purchasable commodity, medical officers of health must be interested in the economic as well as the medical side of preventive medicine, which would include matters concerning family income, housing, food supplies and their protection, and individual recreation. Health education is probably the most urgent need of the Canadian people, for with health education will come the appreciation by the public and their government of the need for adequate funds for its application and implementation and resultant increased happiness for our people. However, I propose to deal with the medical rather than the economic aspects and to limit my remarks to a few of the most striking subjects covered by the more liberal interpretation of child hygiene:

1. *In the infant,* the effect of pre- and post-natal diet on health; correction of haemorrhagic tendencies of the newborn; advances of the newer technique in transfusion of the newborn; and the newer therapy of coeliac disease.

2. *In the pre-school child,* the outlining by Gesell of the means of assaying the rates of progress of neuro-muscular co-ordination and the increasing interest in child and parent education.

3. *In the school-age and adolescent child,* the increasing interest in the emotional problems of adolescence; parent education; recent advances in the care of poliomyelitis; and the relation of diet to the activity of rheumatic fever.

Nutrition

The most striking work in nutrition has been the demonstration in Toronto (1) of the effect of diets which were made adequate by the addition of supplements of iron, milk, eggs and vitamins to the usual family supplies. Not only was the health of the parturient mother improved, but the nutritional status of the infant was above that of the control group. Moreover, the effect of such improvement continues throughout the period of pregnancy, as shown by a lessened morbidity and mortality, better tooth development, and the absence of dental caries. While the effect of improved nutrition of the parturient mother has been properly appreciated, I feel that the importance of this effect on the infant has not been adequately stressed. It is much less expensive to nourish our pregnant mothers so that they may have healthy offspring with good bones and sound teeth than to attempt later to repair the damage done by poor nutrition; just as we recognize that the best period at which to treat the congenitally luetic child is during the pregnancy. While admitting the probability that one cannot alter the inheritance of the constitutionally inferior, I do look forward to the day when, as a result of more adequate ante-natal care, caries of the deciduous teeth will not be so much a problem in paedriatic practice. This is, I admit, a problem in the education of the general practitioner by our schools of medical teaching, but I would suggest that a physician adequately trained in family nutrition will

One of a series of papers outlining recent contributions to knowledge in the various fields of public health, presented at the wartime conference and thirty-second annual meeting of the Canadian Public Health Association, held in the Royal York Hotel, Toronto, on October 4 and 5, 1943.

be of more value to the community than the man who, as a medical student, has spent an excessive number of hours on the study of anatomy.

Correction of Haemorrhagic Tendencies of the Newborn

Intracranial haemorrhage following the trauma of delivery is happily becoming less and less frequent with the improvement of obstetrical technique and training. Conservative rather than active therapy of the few cases now occurring usually gives satisfactory results, though one still sees occasional spastic or epileptic children whose disability may be due to the trauma of delivery. These, however, are less frequent than twenty years ago. Of greater importance is the role of asphyxia or anoxemia in the production of cerebral damage—complete anoxia for a period of time as short as forty-five seconds will produce irreversible changes and irreparable damage to cerebral tissues. The recognition of this as a cause of cerebral atrophy and mental backwardness is a real advance, but the prevention of its occurrence lies in skilful obstetrics and the appreciation by the practitioner of the occasional need for haste in the establishment of respiration of the newborn baby and the intelligent use of oxygen for the baby and analgesics for the mother (2).

Spontaneous haemorrhage in the newborn is now readily controlled, due to the widespread use of vitamin K (3) which in many clinics is administered routinely to parturient mothers or their offspring, in the case room. While not universally accepted as routine, it does appear to me to be a proper procedure in view of the technical difficulties apparent in making prothrombin estimations in the newborn, particularly at the present time when there are shortages of staff, both medical and technical.

Haemorrhagic Disease and Jaundice

The recent clarification of oedema and jaundice (so-called erythroblastosis) in the newborn by the recognition by Levine (4) and others of the role of the Rhesus or Rh factor in its production is of extreme interest. It would appear that the Rh-positive father produces an Rh-positive child if the Rh factor in his blood be dominant, stimulating the production in the mother's serum of anti-Rh agglutinins which pass back into the foetal circulation through the placenta, with resultant haemolysis in the foetus or the newborn infant. This accounts for the haemolysis, anaemia and jaundice with the appearance of erythroblasts in the circulating blood, enlargement of the liver and spleen and the liability to spontaneous haemorrhage. It is perhaps too much to hope that our generation will ever see the theories of eugenics put into practice, with all the psychic and biological assays that this implies; but surely some form of pre-marital examination which would do more than rule out the presence of latent syphilis, should be introduced at once. This should, if possible, include the determination of the presence of the Rh factor in the prospective parents, for the possibilities of healthy offspring from the union of an Rh-positive male with an Rh-negative female, become progressively much less favourable after the first pregnancy, and the casualties of such a pregnancy are preventable only by one means. The simplification of the technique of blood transfusion of the newborn, by the

group at the Boston Children's and The Lying-in hospitals, by the use of the scalp veins for the administration of citrated blood, has been the means of saving some infants whose chances of survival would otherwise have been lessened, particularly premature babies, those born in a debilitated state and some cases of erythroblastosis. In the latter group, even if they survive—and few do—irreparable damage has usually been caused to the basal nuclei, particularly the lenticular and putamen, the so-called "Kernicterus" producing varying degrees of spasticity and mental backwardness. However, this technique of transfusion has been of definite value in reducing the mortality rate in premature infants.

Coeliac Disease

Finally, in the infancy group, I would direct your attention to the work of McCreary (5) of Toronto, and the Boston group, in the therapy of chronic intestinal indigestion or coeliac disease. The therapy of chronic intestinal indigestion has heretofore depended on the supply of a high protein diet over a period of months or years, through the exclusion of fats and most forms of carbohydrate other than bananas. Strangely enough, in the banana the carbohydrate, which is principally sucrose, seems to be of value in the nutrition of these infants. The suggestion is now made that the banana is of value not only because of its sucrose, but also because of its vitamin B content. McCreary has proposed the parenteral injection of crude liver extract and vitamin B (whole) intramuscularly. He found that with the administration of these substances the patient may frequently be returned to a normal diet after two or three weeks, and make a fairly prompt recovery. Dr. McCreary has, owing to his enlistment in the armed forces, made so far only a very interesting preliminary report of his observations, though some of us who have used the therapy as he has outlined it have had gratifying results in practice.

The Pre-school and School-age Child

Turning now to the pre-school and school-age child, the renewal of concern in child and parent education is of interest. I do not refer to the apparent trend away from the progressive school of thought, that the child should not be thwarted but should learn by actual experience and experiment rather than by instruction, to the essentialist school of thought, putting emphasis on the three R's as a form of mental discipline and the use of group activities and instruction as a means of education. My thought was to interest you in the necessity of the education of the parents as well as the child. I know of no greater undertaking in life into which the average parent moves with less forethought and preparation than the education and rearing of a child. Some means of educating our young people in the skills of parenthood must be evolved at once if we are to have an emotionally stable population. In the child we recognize that there are certain standards for height and weight, dentition and neuro-muscular co-ordination or performance. However, in the state of the newborn infant, an individual may be described as more or less an automatic personality. This has been beautifully demonstrated by the work of Gesell (6) of the Institute of Human Relations at Yale University, where infants have been observed under

ideal conditions and their reactions to certain environmental stimuli have been studied and photographed. Of particular interest is the tonic neck reflex, in which the contra-lateral arm and leg tend to be flexed on turning the head and neck. These tonic reflexes usually disappear at the age of three months, and if such tonic neck reflexes persist in a child six to eight months old, we can consider that of value in determining either that this child has some congenital anomaly of his nervous system or has suffered some injury at birth which has affected the rate of his neuro-muscular development. Likewise, there are certain standards which have to do with mental growth. Where the child measures up to certain standards, which we speak of as intelligence quotient scales, we consider his I.Q. normal; but there are no recognized standards for emotional growth or emotional maturity.

To my mind, there is nothing which is of more value to an individual than the possession of a stable emotional nervous system; that is, being able to meet various disasters and disappointments without showing undue emotional disturbance. This has to do particularly with the "anxiety" state, which in an adult is, to my mind, conditioned by the emotional state or emotional level at which that individual as a child met various disappointments. This may be expressed as an acceptance of the increasing distance between desire and achievement (*7*). I would impress on you that education, as far as the newborn baby is concerned, begins at birth, and education consists essentially of the ability of the child to adapt himself to changes in his environment. A child whom we consider emotional is one who meets new situations by dissolving into tears and shrieking for his mother. Emotional children develop from emotional households; that is, the emotional level of the household determines the age at which the child will develop what I am pleased to call "emotional stability" (8). An individual can only be brought to a point of emotional maturity by the precept and example of those in his environment, and the emotional level of the household depends on the emotional maturity of its members. Such a level depends more on the emotional stability of the mother, who sets the tone of the household, than on the father. We as physicians have been remiss in our duty in not appreciating the factors of fatigue and anxiety in the lack of emotional control in mothers; and I think it is a great part of the work of a physician that he should learn means for reassuring harassed parents. Parents are always worried, whether their causes are factual or imaginary. The reassurance of parents as regards the physical, mental and emotional welfare of their children, should be one of our great aims. If we can assure parents that things are going satisfactorily with their children, we can do a great deal to re-establish some emotional stability in parents. Until we do so, we cannot look for marked improvement in the emotional stability of children, particularly adolescents who reflect the emotional levels of the homes from which they come.

Adolescence

The problems of adolescence and physical maturation do, in my opinion, belong in the field of the paediatrist; not only because he has watched over the

individual through the period of infancy to that of adolescence and, like any other physician, is sorry to lose his patients, but even more definitely because his is the only really interested medical group who have tackled, though fitfully and sometimes with a poor technique, the emotional problems of that particular age-group. This applies also to the recognition and, if possible, the therapy of so-called glandular disturbances, which should be recognized and corrected by the group who have control of the care of the infant and young child, before they become young adults with resultant irreparable changes. One of the possible dangers of the proposed National Health Insurance Act may be the removal of this age-group from the care of those who are interested in its medical welfare. The practice of paediatrics needs no defence from me; we were the first group to apply the principles of preventive medicine in practice, and the great decrease in infant mortality and the consequent increase in the expectation of life have followed increased knowledge of infant nutrition and infant care, rather than the control of disease. I foresee a danger that an age-group in which we as paediatrists are interested, and which I think we are more competent to advise than the busy family practitioner, may be deprived of the expert care which they need and to which they are entitled.

The Newer Conception of Poliomyelitis and Its Care

The newer conception of poliomyelitis as expressed by Sister Elizabeth Kenny and her co-workers is that the primary manifestations of the disease are not those of early paralysis, but of muscle spasm; that is, the muscle spasm produces the pain in the limb, the stiffness of the neck, the stiffness of the hamstring muscles and frequently the respiratory difficulty. This conception does not suggest that paralysis does not occur. Paralysis of muscles unquestionably occurs and may be residual and severe, and true paralysis may cause death, though this fortunately is rare. The common manifestations of spasm are in the positive Kernig's sign, the hunched shoulders caused by spasm of the trapezius, stiffness and rigidity of the back and neck caused by spasm of the erector spinae group or the quadratus lumborum, and the quite common adductor spasm of the thighs. Where such spasm occurs for instance in the gastronemius with plantar flexion of the foot, there may appear a transient apparent paralysis of the anterior tibial group. To call this an apparent paralysis is by no means to deny that true paralysis does occur. This is the primary difference between Miss Kenny's approach to the disease and that which we have accepted heretofore. Thus Miss Kenny conceives the primary manifestations to be due to spasm rather than paralysis, and with this primary conception many are in agreement. The so-called Kenny method of treatment is based primarily on this conception of the clinical manifestations of the disease—that is, that spasm of muscle can be relieved by the application of heat; and under Miss Kenny's tutelage, particular methods for the application of a particular type of heat have been satisfactory in the relief of spasm. The more important part of Miss Kenny's conception of treatment concerns the progress of the patient after spasm has been relieved by hot packs. This is so-called muscle re-education. The use of the method of treatment is, of course, not new; we have used it for many years for such

patients, but not, I think, as intensively or with the same background of knowledge of muscle function, anatomy and physiology as Miss Kenny has brought to bear on the subject. The re-education of the damaged muscle, even though but a few fibres remain definitely active, goes on slowly, painstakingly and with infinite patience, and it is this characteristic of Miss Kenny's later work after the spasm has been relieved, which apparently produces such excellent results.

We have been disconcerted during the past year with our frequent failure to find striking changes in the cerebro-spinal fluid and had almost arrived at the conclusion that poliomyelitis could occur without spinal-fluid change in cell count or protein. However, it would appear that the progress of clinical signs is associated with a change in the spinal fluid, in that lumbar punctures repeated at intervals of 48 hours show a gradual alteration and increase of the cell count, and more strikingly an increase in the total protein of the spinal fluid as the disease progresses. In those patients who develop evidence of true palsy there is probably always at least a rise to an abnormal figure in the total protein of the spinal fluid. Where weakness occurs, there is always some change in the total protein of the spinal fluid and usually a pleocytosis. The point to be made is that it is impossible to rule out poliomyelitis in a suspected case by the findings of a normal spinal fluid on the first examination. It has been our practice in a suspected case to dismiss a diagnosis of infantile paralysis on the findings of a normal spinal fluid. The danger of this practice is apparent.

Rheumatic Fever

As one studies the childhood disease, rheumatic fever, one is struck more and more by two factors: its "social" implications and its "family" relationship. Socially, the disease appears in a definite economic group, not in the destitute and rarely among the well-to-do; and in most communities it is definitely not a disease of private practice as distinct from hospital practice. While it is admittedly a disease of children and should be seen in the practice of those confining their work to diseases of children, few paediatrists encounter the disease in their private work, though it is common in hospital work. It would seem, therefore, that the social aspects have much to do with its frequency. Many years ago, the Royal Commission in England showed an apparent relationship to climate, housing and dampness. Experience in this country would strongly suggest that these factors may also play a part here, and that the social group who acquire the disease here are badly housed and overcrowded, with the well-recognized increase in infection rates—including those with the haemolytic streptococcus—associated with inadequate housing facilities. The prevention of rheumatic disease, from this point of view, is then a social and economic problem, rather than a medical or immunological one.

Recent work by Coburn (10), on the possible relation of dietary factors to the occurrence or re-activations of rheumatic disease is, in this connection, of extreme importance. His findings support the probability that certain dietary insufficiencies, notably in protein, iron, calcium and vitamin A, usually in combination, may bear a definite relationship to susceptibility to this disease. Such a relationship is suggested but not claimed. The possibility becomes of even

greater interest when one considers the frequency of rheumatic fever as a family disease. If the family unit, all exposed to the same housing conditions, the same frequency of infections with the haemolytic streptococcus, or other organisms, and subsisting on a diet lacking in the same types of food factors, develops a specific disease, it seems possible that some of the problems of rheumatism may soon be solved. Cheadle's conception of the "rheumatic soil" as an explanation may be quite correct, if "soil" be considered the human framework, conditioned by diet, infection and environment. Such conclusions, if justified by later work, suggest that the prevention of rheumatic fever is a social-economic problem possible of alleviation by better housing, with relief of overcrowding, and diminished frequency of infections, together with improved knowledge of nutrition by the public. The educated social group, adequately housed, is in no danger of deficient dietary intake of calories, protein, vitamin A, calcium and iron, but many working-class groups do live on such diets, do live in inadequate houses, and do live more than "one to a room."

Like the prevention of tuberculosis, it would seem that prevention of rheumatism is a social-economic problem. The sooner we can provide adequate housing and proper nutrition for the economically necessitous groups, the sooner will the the problem of rheumatic disease be solved. Already knowledge has been accumulated from which it may be possible to solve this problem, even though definite proof of its etiological factors is not yet established. From the public-health viewpoint, it would seem entirely logical that rheumatic fever be made a reportable disease. In spite of the above suggestion, we recognize that under certain conditions rheumatic fever has some characteristics of an epidemic infection, e.g., among young soldiers in crowded barracks, following epidemic sore throat, though they are adequately nourished. However, if it were made a reportable disease, and the public-health authorities were encouraged to regard it as a social and nutritional problem, as well as a problem in immunity or infection, factual knowledge concerning control of the disease and its prevention would rapidly increase. The new "social" medicine will, no doubt, achieve this and actually prevent rheumatic fever.

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Population Changes Revealed by the 1941 Census

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THE taking of a census is a complicated business. The Report of the Advisory Committee on the United States Census, 1921, states: "Of all peace-time activities of the Federal Government, taking and compiling the census is the largest." When a census is taken in wartime, the task is still more complicated. I should like to discuss a few of the problems which arise in the taking of any census, some special ones in the taking of the 1941 census, and a few of the significant facts revealed by it. My remarks will necessarily be brief, because each point that I shall raise could supply sufficient matter for a much longer discussion than the one I propose to give today.

THE TAKING OF A CENSUS

The first task connected with the taking of a census is the preparation of the questionnaires. This requires a great deal of care and attention, because the results of a census can only be as good as the questionnaires used to obtain the information. The questions asked must be such that they will secure the most reliable and timely information. In the preparation of the schedules, the Bureau of Statistics invites suggestions from all persons interested. There must be a limit to the length of the questionnaires, but we always welcome suggestions which will enable us to make the forms more effective.

In order to proceed with the enumeration in a systematic fashion and to ensure complete coverage, the country is divided into enumeration areas, all with approximately the same population so that, barring accidents, all enumerators may complete their work at about the same time. The basis of the enumeration is the Federal Electoral District, and a commissioner is appointed for each. The commissioners, in turn, appoint an enumerator for each area. Enumerators vary in number from about 40 in the smaller districts to as high as 150 in the larger or more densely populated ones. The commissioners are instructed in their duties by an officer of the Bureau and they, in turn, instruct the enumerators, who in 1941 numbered over 15,300. The most important problem in connection with the instruction of commissioners and enumerators is to see that everyone, from one end of the country to the other, places the same interpretation on the questions asked. This brings out the importance of having questionnaires which do not lend themselves to misinterpretation.

The Census of 1941 was scheduled to start on June 2nd, but due to circumstances over which the Bureau of Statistics had no control, it was postponed until June 9th. This constituted the first important problem which had to be

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solved at a moment's notice. Some of the enumerators who had been instructed during the spring found that they could not carry on at the later date and consequently had to be replaced, placing on the commissioners, at this late date, the burden of finding and instructing satisfactory substitutes.

After the enumerators have completed the job of enumeration, the schedules are turned over to the commissioners, who check them before sending them to Ottawa. When they arrive in the Bureau of Statistics, the schedules are checked line by line, and any incomplete record is returned to the enumerator for completion. After the checking is completed, the lines are counted and this count is the source of our preliminary announcement of the population of cities, towns, villages, rural municipalities and electoral districts.

At this point, two major problems arose from the taking of a census in wartime. First, it was necessary to make sure that all the members of the Armed and Auxiliary Forces, whether in Canada or elsewhere, were included in the census. In addition, since the Canadian census is taken on the "de jure" principle, it was necessary to assure that each member would be enumerated in his permanent place of residence.

The enumerators were instructed to enquire in every home whether or not members of the household were in the Armed or Auxiliary Forces. If in the affirmative, these persons were to be enumerated just as though they had been present in the household at the time of the census, the information being supplied by a member of the household. In addition, the enumerator was to state, in a special column provided for the purpose, whether these persons were overseas, on active service in Canada or at camp for compulsory military training.

Fearing that a certain number of persons might be overlooked either through neglect on the part of enumerators or for other reasons, a special census was taken of all military camps in Canada; and in the case of persons outside Canada at the time of the census, records were obtained from the Department of National Defence.

To ensure against omission or duplication of names in the census, cards were punched on the alphabetical key punch for all the persons included by the regular census enumerators as being in the Armed Forces. Another set of cards was similarly punched from the census of military camps and from the National Defence records. These two sets of cards were then sorted in alphabetical order, listed, and compared name by name. Over 80,000 names omitted from the regular census were thus added. This large figure, however, does not mean that the enumerators had neglected their duty. The great majority of persons thus omitted from the regular census were persons who had no family connections; that is, before their enlistment they had been living in boarding houses or apartments and no one was left behind to claim them as members of the household.

The other serious problem which arose from the taking of a "de jure" census in wartime was caused by crowded conditions in certain localities. At the time of the census, a large number of persons were living in temporary quarters, such as summer cottages. This condition was not altogether new, for at the time of the 1931 census some 4,000 families were away from their regular homes. In

1941, this number was over 26,000. Thus it was necessary to transfer the information regarding all the members of these families from the enumeration book in which they were recorded at the time of the census to that covering the area where their permanent homes were located.

These two special tasks required the full time of over 200 clerks for several months.

After all the previously mentioned work was completed, the schedules were ready for the coding of the information to be punched on Hollerith cards. In the 1941 census, for population, housing, occupations and agriculture over 24,000,000 cards were punched and verified. After the punching came the tabulation of the cards on our special census machines—a task which is still being carried on.

In this work, a great many other difficulties were created by the war. In the first place, the demands of the war created a great scarcity of punching, sorting, tabulating and calculating machines. We were, therefore, unable to obtain the number of machines that we normally would use. Secondly, the scarcity of the machines was felt by war departments as well as by the Bureau of Statistics. Consequently, on different occasions it was necessary to put aside the work of the census for considerable periods of time so that the machines could be made available for other jobs which were deemed to be more urgent. Thirdly, by 1941 the war had created a great demand for clerical assistance, and the Grade 1 clerks who were compiling the census began to resign in large numbers. It takes several weeks to train a clerk to operate machines properly, and as our Superintendent of Mechanical Tabulation has had to train over 400 clerks for the filling of 100 positions in the tabulating room, we have had an inexperienced staff on our machines, resulting in a considerable loss of time. In order to make up for the scarcity of machines, our staff has been working on two shifts, which necessitates the duplication of supervision, thus doubling the strain on our small number of trained personnel.

These unprecedented difficulties explain why our plan of tabulation has somewhat miscarried in the present census.

As in other censuses, the census of 1941 has revealed a very large number of facts. Some have already been published and others will be in the near future. I should like to mention briefly a few of these findings.

Facts Revealed by the 1941 Census

The total population of Canada was shown to be 11,506,655 on June 2, 1941, as compared with 10,376,786 on the same date in 1931, an increase of 1,129,869 or 10.9 per cent during the decade. This increase is numerically the smallest since the decade 1891-1901 and proportionately the smallest of any decade since 1851. All provinces except Saskatchewan contributed to the increase. The increases by province were as follows: Prince Edward Island, 8.0 per cent; Nova Scotia, 12.7 per cent; New Brunswick, 12.1 per cent; Quebec, 15.9 per cent; Ontario, 10.4 per cent; Manitoba, 4.2 per cent; Alberta, 2.6 per cent; British Columbia, 17.8 per cent; while Saskatchewan showed a decrease of 2.8 per cent. It must be noted that while Saskatchewan is the only province to show an actual decrease in

population, five other provinces show increases which are lower than their natural increase.

The urban population of Canada increased by 680,358 or 12.2 per cent while the rural population increased by 451,251 or 9.4 per cent, and the farm population decreased by 4.0 per cent. This shows that the urban population increased at a higher rate than the rural but, during the decade 1931-1941, 62 new urban centres were incorporated. Had these centres remained rural as they were in 1931, the urban increase would have been only 11.3 per cent while the rural increase would have been 10.3, indicating that the rural population contributed almost as much to the growth as did the urban. It must be noted also that over one-third of the urban localities showed decreases in population, indicating that a number of urban centres have grown during the decade as much at the expense of other urban centres as at the expense of farm or other rural population.

While eight out of the nine provinces registered increases in population, it is of interest to consider how the population increase was distributed within each province.

Prince Edward Island.—In Prince Edward Island the population, which had been decreasing for four successive decades, showed an increase of 7,009 or 8 per cent. The urban population increased by 19.4 per cent and the rural population by 4.5 per cent, while the farm population decreased by 7.9 per cent. The increase in population is found almost exclusively in the urban localities and in the rural areas adjoining them. During the ten-year period, births exceeded deaths in the province by over 9,600 so that without emigration the population would have increased 11.0 per cent instead of 8.0. In addition, in 1941, there were 3,074 persons in Prince Edward Island who were not there 10 years before. Of these, 1,611 immigrated to Canada in the last ten years. This indicates an emigration which is more than twice as large as that suggested by the difference between the net increase and the excess of births over deaths.

Nova Scotia.—Nova Scotia, which had shown a decrease of over 10,000 in population during the decade 1921-1931, showed an increase of 65,116 or 12.7 per cent during the last decade. This represents the largest numerical increase of any decade since 1851 and a percentage increase which has not been exceeded since the decade 1871-1881. The urban population showed an increase of 15.5 per cent, while the rural population increased 10.4 per cent and the population living on farms decreased by 19.2 per cent. The births exceeded the deaths in the decade by slightly over 57,000, the absolute increase, therefore, indicating a net immigration into the province of something like 8,000. In 1941 there were in the province 27,646 persons who were not there in 1931 and 13,661 of them came to Canada within the last ten years. This indicates that at least 19,000 Nova Scotia residents must have left the province during the decade.

It is also of interest to note that while Nova Scotia had a population increase of 12.7 per cent during the decade, two counties showed decreases, and 5 showed increases of less than 5 per cent, while four—Cape Breton, Colchester, Halifax and Kings—had 77.4 per cent of the total increase, 82 per cent of the urban increase, and 71.5 per cent of the rural increase of the whole province. The farm population decreased considerably in each of these four counties, showing that while the province had a remarkable population increase during the decade, it was confined to a few urban centres and their suburban areas.

New Brunswick.—In New Brunswick the increase in population during the last decade was 49,182 or 12.1 per cent, a larger numerical increase than has occurred since the decade 1851-1861, and the largest percentage increase since the decade 1871-1881. In the decade, births exceeded deaths by over 59,000 and 16,551 persons moved into the province. Of these latter, 6,524 had immigrated to Canada in the last ten years. There must have been, there-

fore, a movement of some 26,000 away from the province. The urban population of the province increased 11.2 per cent while the rural population increased 12.4 per cent and the farm population decreased 9.2 per cent. Unlike that of Nova Scotia, the increase in the population of New Brunswick was general in all counties except Carleton and Charlotte, where the increase was only slight.

Quebec.—In Quebec, the increase in population was 457,220 or 15.9 per cent, a numerical increase which is less than that of the preceding decade and the lowest percentage increase since the decade 1891-1901. In this province, births exceeded deaths by over 459,000 and 88,369 persons moved into the province in the decade. Of these latter, 34,411 have been in Canada less than ten years. This indicates that about 90,000 persons left the province during the decade. The urban population increased by 16.3 per cent and the rural by 15.2 per cent while the farm population increased 8.9 per cent. As in New Brunswick, therefore, in Quebec both rural and urban population contributed to the increase at almost the same rate. It is, however, of interest to note that the increase has not been general across the province. Three counties showed decreases in population and eight showed increases of less than 5 per cent. Twenty-one of the sixty-six counties of the province contributed 80 per cent of the total increase. These counties fall into three definite groups, those whose increase is due to urban growth, those due to both rural and urban growth, and the others where the growth is due almost exclusively to colonization. While farm population showed an appreciable increase in the province, it is of interest to note that it decreased in 22 counties and showed an increase of less than 5 per cent in 14 others.

Ontario.—In Ontario, the increase in total population was 355,972 or 10.4 per cent. Numerically, this increase is the lowest since the decade 1901-1911, and proportionally it is the lowest since the decade 1891-1901. During the decade, births exceeded deaths in the province by over 278,000 while 200,993 persons in the province in 1941 were not there in 1931, and of these 77,678 have been in Canada for less than ten years. Therefore, while these people were coming into the province, almost 120,000 were leaving to go elsewhere. The urban population increased 11.6 per cent and the rural 8.5 per cent, while the farm population decreased by 12.1 per cent. Here, again, rural and urban contributed to the increase though not quite at the same rate, while the farm population in all but three counties showed a decrease.

In the province, eleven counties showed decreases in population and thirteen an increase of less than 5 per cent. Thirteen of the fifty-four counties of the province were responsible for 75.1 per cent of the total population increase.

Manitoba.—In Manitoba the increase in total population was 29,605 or 4.2 per cent, the lowest numerical increase since the decade 1861-1871 and the lowest proportional increase on record. The excess of births over deaths in the decade was over 78,000 and during the period 47,571 persons, 9,346 of whom had not been in Canada ten years before, moved into the province. Some 95,000 persons, therefore, must have left the province in the ten-year period. Of the sixteen census divisions of the province, five show decreases in population, and only three (divisions 1, 15 and 16) show increases sufficiently large to indicate immigration into these areas. The farm population shows a decrease of 2.3 per cent and nearly 50 per cent of the urban localities also show decreases.

Saskatchewan.—In Saskatchewan, the total population decreased by 25,793 or 2.8 per cent while the farm population decreased by 8.7 per cent. During the decade, births exceeded deaths by over 131,000 and 30,659 persons moved into the province, indicating an exodus of some 187,000 persons. Of those who moved into the province, 7,972 had been in Canada less than ten years. Eleven of the eighteen census divisions show decreases and only divisions 14, 17 and 18 show evidence of having received population from elsewhere. Three-quarters of the urban localities show a decrease in population.

Alberta.—In Alberta, the total population increased by 64,564 or 8.8 per cent, the lowest numerical and proportional increases on record. In the decade, births exceeded deaths by over 106,000 and 53,934 persons moved into the province, indicating that some

95,000 residents must have moved elsewhere. The urban population of the province increased by 10.1 per cent, the rural population by 8.5 per cent and the farm population by only 2.3 per cent. Two census divisions showed a decrease in population, six showed increases of less than 5 per cent, and another six were responsible for 93 per cent of the total population increase of the province.

British Columbia.—In British Columbia, the increase in population was 123,598 or 17.8 per cent. Both the numerical and percentage increase are lower than those of the preceding decade. Births exceeded deaths by over 41,000, and 138,008 persons moved into the province during the decade, indicating that some 55,000 persons must have left the province to live elsewhere. Of those who moved into the province, 21,842 had been in Canada less than ten years. The urban population increased by 12.3 per cent and the rural population by 25.0 per cent while the farm population decreased by 1.4 per cent. Two census divisions in the province (1 and 9) showed a decrease, while three others (3, 4 and 5) were responsible for 89.0 per cent of the total increase.

This consideration of the behaviour of the population of Canada, both interprovincially and intraprovincially, brings out a few evident facts:

1. While only one province showed an actual decrease in population, six contributed to the increases of the other three.

2. For the first time in this century emigration exceeded immigration, though both were light.

3. The lowering of the birth rate is responsible for the relatively small increase in population. This decrease has been in evidence for a considerable period of time.

4. There has been a considerable shift of population within the provinces, and some areas have developed at the expense of others. This shift is due to economic conditions during the decade. In the Maritime Provinces, the population has increased because a large proportion of the population of these provinces which normally would have migrated to other provinces or to the United States have stayed at home. Some of the increase is also accounted for by the return, during the depression, of population which had gone to other areas. In the Prairie Provinces, the effects of the drought must also be added to the effects of the depression. Finding no inducement to migrate from one province to another, the population has searched the most advantageous positions within its own province. This is in evidence even in the Prairie Provinces, though from there emigration to other provinces has been greater.

5. In all provinces except Prince Edward Island and Nova Scotia, the rural population has increased at almost the same rate as the urban. It is true, however, that a great deal of the rural development is in suburban areas. One-third of the urban localities of Canada show a decrease in population.

Problems in the Preparation of Intercensal Estimates of Population

In the foregoing discussion I have tried to emphasize the considerable interprovincial movement of population. There is no doubt that this movement has even been accelerated in the years that have followed the 1941 Census and this brings me to mention some of the problems arising in the preparation of intercensal estimates of population.

The population of Canada, year by year, is estimated on the basis of (1) the natural increase as revealed by vital statistics; (2) immigration by province of destination as given by the reports of the Department of Immigration; (3) emigration to the United States and the United Kingdom. To this may be added emigration to other countries on the basis of data from these countries. The data indicate that the emigrants to countries other than the United Kingdom bear the same proportion to the immigrant population of Canada born in these countries that the emigrants to the United Kingdom bear to the population of Canada born in the United Kingdom. In addition, logistic and other curves are used, but only as tests.

In estimating the population of the provinces an additional factor enters, namely, interprovincial migration. This is the most difficult to measure as it is sometimes very large and the only indications are rates based upon school attendance, etc. If the estimate for the Dominion be regarded as correct, the natural increase and immigration are immediately apportionable between provinces. The emigration from the Dominion is assigned to provinces, according to the population of each province born in the country to which emigrants go. A provisional estimate of the net increase of each province is thus obtained. When this is added to last year's population, the results are checked by calculating separately the rates of births, deaths, marriages, and school attendance, and the changes in each of these rates are compared with the changes in the Dominion as a whole.

The results have been customarily checked by logistic and other curves. These are only useful, of course, when changes are gradual. Such curves provide no help whatever now, because of the changes brought about in the various parts of Canada by the war. Further, it is evident that the use of birth, death, and marriage rates to check the results is a mere begging of the question, since it is for the purpose of calculating such rates that the whole procedure is undertaken. We must admit that we have no knowledge of interprovincial movements, and under present circumstances of very heavy migration, this lack of knowledge prevents the presentation of usable estimates. The magnitude of the problem is evident when it is realized that there are indications of a loss by one western province alone of over 100,000 persons in the two years following the census, so that an estimate based on natural increase could be incorrect by almost 15 per cent. At the present moment we are hoping that the count of the third ration book will solve the problem for 1943, but for subsequent years a sample census may be the only possible solution.

Findings of Importance from the Public-Health Standpoint

Now, I would like to mention a few changes revealed in the 1941 Census which are of importance from a public health standpoint, in particular the age distribution and the sex ratio. Changes in these attributes of the population are necessarily small in a ten-year period and to illustrate the trend I have, in many cases, gone back to earlier periods.

To make the discussion as concrete as possible, let us consider for a moment the deaths in British Columbia and in Saskatchewan in 1941. Though the female

population of Saskatchewan is 36,000 greater than that of British Columbia, the deaths in Saskatchewan are 2,637 against 3,153 in British Columbia. The rates are 6.3 and 8.2 per 1,000 respectively. Everyone knows that these do not provide a true measure of mortality because of difference in age constitutions. The wearisome procedure of taking each age separately is fortunately not necessary. We can speed up our comparison by taking what amounts to a weighted average of the age-specific death rates, using, according to a nearly universal convention, the age-sex distribution of England and Wales in 1901 to provide the weights. The resultant standardized figures are 6.52 and 6.54 respectively.

The difference between the crude and the standardized rates is easily explained by age differences: We find that 2.7 per cent of the female population of Saskatchewan is over 70 years of age, against 4.4 per cent of that of British Columbia; 43 per cent of the female population of Saskatchewan is between ages 5 and 20, against 31 per cent of British Columbia's. In Saskatchewan there is a relatively large number of females at the early ages of life and the number steadily decreases towards the oldest; British Columbia shows a flatter distribution.

Since age-distribution is so great a factor in the death rate, and equally relevant in all other health statistics, there is a very legitimate interest in a study of age-distributions by themselves. I shall, therefore, devote some time to age, sex, and rural-urban differences within the Canadian population.

Ages may be conveniently considered under four heads representing the main periods of life which are significant from a health point of view.

1. The proportion of males under five years of age decreased in Canada from 18.6 per cent in 1851 to 14.8 per cent in 1871 and has continued downwards, fairly steadily from decade to decade, to 9.1 per cent in 1941. There are no important differences between sexes in this age class because, in the first place, it contains few migrants, and secondly, because there is no reason why migrants of so young an age should be differentiated by sex. The decline in the proportion of the total population is a reflection of steadily declining fertility rates.

As the compilation of the population by single years of age is not yet available for 1941, we shall have to speak for a moment in terms of 1931. British Columbia is the lowest province in the proportion of its total population under one year of age, and Quebec is the highest; these provinces are also the lowest and highest respectively, in the percentage of their total population from 1 to 4 years of age. British Columbia is also the lowest in the proportion of its population between 5 and 9 years of age, while Quebec shares first place with New Brunswick. These relative standings correspond to the crude fertility rates of the several provinces in the years preceding the census, Quebec being the highest and British Columbia the lowest. In the later ages, the relation between the proportions at the younger ages and fertility becomes blurred by the intervention of other factors, principally migration. To trace such differences in fertility to their basis would take too long for this paper.

We may, however, consider briefly the differences between the rural and urban parts of each province in the proportions at the very youngest ages. In

all provinces, the fraction of the total population under one year of age is higher in the rural parts than in the urban, except in Nova Scotia, where they are equal. For the country as a whole, the percentages are 2.16 and 1.78 respectively. Within the urban group there is a striking difference between localities of 30,000 and over and those between 1,000 and 30,000, the former being lower, except in Saskatchewan, in the proportion of children shown. There does not seem to be any consistent direction for the difference between the urban localities under 1,000 population and those larger, possibly because the urban centres of less than 1,000 population vary greatly in character. Of the rural population of Canada, 9.48 per cent are in the 1-4 age group, against 7.48 per cent of the total urban population, 6.90 per cent in the urban localities of 30,000 and over, and 8.14 per cent in the urban localities between 1,000 and 30,000.

Comparing the population of Canada with that of other countries in respect of the proportion under 15 years of age, we find that in general the countries of Western Europe are lower, while those of Eastern Europe, Asia and Latin America are higher, and the United States are about the same. Thus, in comparison with 32 per cent in Canada, England and Wales show 24, France 23, Belgium 23, Denmark 25, Ireland 29, Scotland 27. The U.S.S.R. is 37, Yugoslavia 34, and Greece 32 (though Czechoslovakia is only 26). India is 40, Japan 37, Turkey 41, Mexico 39, Brazil 43. There is plainly a connection with the birth rates, though it cannot be definitely shown.

2. Looking at the other extreme of life, the proportion of the male population over 70 years of age has steadily risen from 1.8 in 1851 to 2.3 in 1871 to 3.9 in 1941. The increased proportion reflects a decreasing fraction of new immigrants in the population, improved mortality and lower fertility. It has considerable consequences in relation to old-age pensions, particularly in association with the fact which the 1941 Census reveals in a striking manner, namely, that the proportion of men over 65 years of age who are among the gainfully occupied, is rapidly decreasing. This proportion fell from 55.7 per cent in 1931 to 47.8 per cent in 1941, according to preliminary tabulations on a sample basis. Females show an even more striking rise in older ages, the proportion over 70 more than doubling in a 70-year period, from 2.0 per cent in 1871 to 4.1 per cent in 1941. This is partly the result of even greater improvements in female mortality than in male, partly the peculiarity of our immigration history.

Since the burden of old-age pensions is borne to a considerable extent by the persons of working age in each province, it is of interest to consider the ratio of persons 20-70 to those of 70 and over in each province. For each male over 70 in Alberta, there are 20 between 20 and 70, in Saskatchewan 19, in Quebec 18, in Manitoba 16, in Ontario 14, in British Columbia 13, in New Brunswick 13, in Nova Scotia 12, and in Prince Edward Island 9.

There is an interesting systematic difference between places of different degrees of urbanization in the proportion of the population over 70 years of age. The rural areas have only slightly less than the urban localities as a whole (3.9 per cent against 4.0 per cent) but there are very considerable differences between the different sizes of urban localities. For Canada, the cities of 30,000

and over have 3.7 per cent of their population over 70 years of age, the localities of 1,000 to 30,000 have 4.2 per cent, and the localities of less than 1,000 of population have 6.1 per cent.

The population of school and early working ages are a decreasing proportion of the total population of the country, both among males and females. This reflects, though to a diminishing extent as we get into the older ages, the lowering of the birth rate. These are the ages at which mortality is the lowest in the whole life span, and hence the fall in their proportion is a factor tending to raise crude death rates. The continuance of this fall is likely to have important consequences in the direction of smaller school attendance in relation to population and also, of course, of a smaller number of dependent persons: it will also mean fewer recruits to the working group.

3. At the middle ages of life, there is less evidence of a striking trend in one direction or the other. For example, the proportion of females 25-34 varies between 14.04 per cent in 1881 and 15.89 per cent in 1941. This age class is, of course, the largest contributor to the fertility of the country and it is of interest to note that the changing age composition includes a slight rise in its proportion. The percentage of men between 20 and 70 has risen from 45.1 to 59.1 in the past 70 years, a striking rate of increase.

We find that through most of the ages from 20 to 70 the proportion of the urban is conspicuously higher than the proportion of the rural population, and this is true for each sex separately. However, after the age of 60, the two sets of percentages come very close together. In each age group under age 50, we find an increasing proportion of the population as we go from smaller to larger urban places. This is the reverse of the change which we noted previously between urban centres of various sizes in the proportion over 70 years of age. The result might well be due to a process of migration from smaller to larger places in the younger ages and in the reverse direction in the older.

Canada's age distribution has been steadily maturing. Over the past thirty years, and during the past ten years in particular, it has advanced very markedly towards that of an "old country." The comparison of the 1931 figures with the 1941 shows that two great humps are gradually moving along in our age distribution. The first is now between the ages 25 and 40, the second between 50 and 70. These are separated by a gap in the ages 40 to 50, which shows particularly in the case of males, and which is, in part at least, due to losses in the first world war. The casualties and the stoppage of immigration during the war would operate in the same direction and at the same ages.

The two humps are reflections, in part, of the two important immigration movements of this century—that which just preceded the first world war, and that which followed it. The evidence that this is so is easily obtained from the results of the census which gives for the present population the year of immigration by age. While the figures are not yet available for the 1941 Census, we may make interesting references to the 1931 Census. Some 459,000 immigrants between 1926 and 1930 show more than half their number between 20 and 35.

The earlier group, arriving between 1901 and 1910, numbered 627,000, about two-thirds of whom were between 35 and 55 years of age in 1931.

A factor of equal importance in the age-distributions of the several provinces of Canada is external movement. Fully 38 per cent of the Canadian-born population of British Columbia came from some other province, and about 20 per cent in the case of each of the Prairie Provinces. Quebec is at the other extreme with over 96 per cent of its Canadian-born population born in the province.

The proportion of males per 100 females has varied greatly in Canada between 1871 and 1941, reflecting at each stage the immediately preceding immigration. Thus the ratio of 103 in 1871 rose to a peak of 113 in 1911, declined to 106 in 1921, rose again to 107 in 1931, and dropped to 105 in 1941. There is also some difference in the sex ratio of the immigrants who appear in the 1911 Census and those in the 1931 Census, the former having a sex ratio of 158 and the latter of 129.

The variation of the sex ratio by age naturally follows from the above. All the ages between 35 and 75 show a great predominance of males, reflecting the immigration that came before and after the first Great War. Over the age of 75, there is a striking excess of women, rising to 44 per cent in the age group 90 and over, the indestructibility of women in the older age groups being proverbial. At the very young ages, there is an excess of males, due to the greater number of male births.

Looking back in Canadian history, we find that the sex ratio has always had, roughly, the characteristics mentioned above, except a rather surprising defect of males between 15 and 24 in the early censuses, possibly due to age-selective emigration to the United States.

The sex ratio by provinces varies greatly, the Prairies and British Columbia showing about 13 per cent more males than females; the Maritimes about 5 per cent more males than females; and Ontario and Quebec nearly equal numbers. The Prairie Provinces and British Columbia show this excess throughout their history, British Columbia having nearly 80 per cent more males than females in the years 1891-1911. Prince Edward Island and Nova Scotia, in earlier times, had nearly an equal number of males and females. New Brunswick has always had about a 4 per cent excess of males.

We can best study the sex ratio at special ages. In Prince Edward Island, the sex ratio is 107 for all ages, but 127 at ages 30 to 34 where it is highest; in Nova Scotia the ratio is 105 for all ages and reaches its highest point of 115 at the age group 30-34. In the four western provinces, the heavy excess of males shows most at those ages which contain the immigrants of former years.

British Columbia at the beginning of the century provides an outstanding example of a population heavily weighted with newcomers and we find the highest sex ratios at the ages of migration and those just past the highest migration. It reaches its highest point at 227 in the age group 30-34 in 1891, and this peak moved to age 40-44 in 1901. The decade 1891-1901 had rather light immigration, but in 1901-1911 it was large and the highest point, instead of moving on to an older age group, was 256 at age 25-29 in 1911. Quebec is at the opposite

extreme. In five of the past eight censuses, it has deviated from a sex ratio of 100 only by 0.5 or less, and at no time nor in any age-group did it show a ratio as high as 110.

The question of rural-urban distribution is greatly complicated by the conditions of urban incorporation in the various provinces.

The rural-urban division would be more satisfactory if it were set on a density-per-square-mile basis. To arrive at this, it would be necessary to know the exact area of all municipalities, and as density often varies within a municipality it would be necessary even to know the exact area of enumeration districts. Unfortunately, these areas are not available and, therefore, it is necessary to rely on incorporation to distinguish rural and urban population.

Even with this difficulty, there is substantial meaning in the differentiation between rural and urban population and certain conclusions appear. It would be expected that the percentages of the total population in urban localities would increase as the country becomes more industrialized. In 1851, the rural population was almost seven times as great as the urban; by 1881, it had decreased to only about three times as great; in 1901, 37.5 per cent of the population was urban; in 1911, 45.4 per cent; in 1921, 49.5 per cent; in 1931, 53.7 per cent and in 1941, 54.3 per cent. It is of interest to note that the rate of increase has greatly diminished in the last decade, indicating a considerable slowing up in the rate of urbanization. The issue, however, is clouded by two important factors. First, 62 new localities were incorporated between 1931 and 1941. If these were counted as rural in 1941, as they were in 1931, a considerable part of the increase would be wiped out. Secondly, a good proportion of the rural increase in the decade took place in areas adjoining large urban centres, and there is no doubt that this increase is due to population which is more of an urban character than the population of many small villages. One factor would counterbalance the other, but it is impossible to estimate to what extent. This further brings out the fact that rural-urban distinction as it is now applied will become less and less satisfactory as long as suburban areas continue to develop. The fact remains, however, that the rate of urban increase has slowed down during the decade.

The ratio of rural-urban population is not uniform across the country. The Maritime Provinces and the Prairies all show large excesses of rural population over urban, so that Canada's excess of urban population is due to Quebec, Ontario, and British Columbia. Of the males, 52.2 per cent are urban as compared to 56.6 per cent of the females. This relative excess of females in the urban parts applied to all the censuses since 1851. We have already mentioned the variations in age-distributions between rural and urban.

I have tried to mention to you as briefly as possible some of the problems arising out of the taking of a census and some of the significant changes which are taking place in Canada's population. In so doing, I was forced to make use of a large number of figures but this, you must realize, is the penalty that you have to pay when you ask a statistician to speak to you.

The Infant Welfare Service in the Lamont Health District

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PROBABLY no health service brings greater returns for the effort put into it than does an infant welfare service. We know that the highest infant mortality rate comes within the first two months of life. It is therefore reasonable that the service should stress this age period.

A number of conditions must be met before such a service can be established. There must be available a staff properly trained in infant work, adequate transportation facilities, close co-operation between local physicians and the public-health staff, and prompt reporting of vital statistics to the health-department office.

It was the last item which offered difficulties in this Health District the first few years. There was no way of finding out where the new babies all were and no reasonable service could therefore be initiated. Late in 1941, after some consultation, the Provincial Bureau of Vital Statistics was induced to make this Health District a test area for the Province to see if a feasible plan could be inaugurated whereby local reporters would send their reports to this office, where copies of birth and death registrations would be made and the originals forwarded to the Bureau. We guaranteed to make the copies and forward the originals on the day they were received. We also agreed to refund to local reporters their outlay in postage stamps which must be affixed to reports unless they go directly to the Bureau.

Because our staff knows the reporters personally, we are in a position to remind them that reports are overdue. Thus reporting is probably even more prompt now than it was in the past. The Bureau is satisfied with the results and made the reporting service available to all Health Districts last year.

Our staff worked together to draft an infant welfare record card and, after field trial, the card shown below was agreed upon.

Vital statistics reports reach this office at the beginning of each month and staff nurses visit all babies as soon as possible. When road and weather conditions permit, the visits are completed well before the end of the month. When roads are blocked, as they sometimes are in winter, this is not always possible.

Securing the records called for by the card entails careful enquiry into the health of the infant and a careful inspection. Ample opportunity is presented to note where instruction is required, and to provide it. Probably the most valuable part of the service is the attention paid to infant feeding. Regularity of feeding, adjustment and heating of formulae, and other dietary adjustments are stressed. The instruction is, as a rule, gratefully received. Pertinent literature is left with the mother and is generally used by her to good advantage. The

service is popular and is appreciated especially by the mothers who had no professional attention at the time of delivery, and by those living in distant parts of the District. Many mothers at first offered to pay our nurses for their calls and expressed their appreciation in various other ways. We are especially pleased with the interest shown by our physicians, who have instituted some tentative changes in hospital routine as a result of reviewing our findings.

LAMONT HEALTH DISTRICT			INFANT WELFARE RECORD
Name		Parent	Date
S. D.		P. O.	Birthday
Delivery: Hosp. Home at		Delivered By: Midwife Doctor Unassisted	
Condition at Birth: Normal Prematurity Defects		Wt. at Birth	Present Wt.
Nursing: Reg. Irreg. No. of mos.		Bottle Feeding: Formula Reg. Irreg.	
Present Diet		Advised Diet	
Advised Formula			
Eyes	Skin & Scalp	Umbilicus	Foreskin
Remarks			
Advice			
Return Visits			

FIGURE I

Where the health of the infant and other conditions are found to be satisfactory, only one visit is made. Where medical care is required, the importance of getting it early is stressed and the visit may be repeated. The nurse enquires into the prenatal care that the mother had and emphasizes the need for postnatal attention. In all cases the need for immunization procedures for the infant is pointed out and the mother is told when and where to go for them. Since the service was organized, our immunization clinics have shown improved attendance.

Below are given some figures on visits made in 1943 which may be of interest:

Infants visited	Boys 128; Girls 140—268			Umbilical hernia	14 — 5.2%
Deliveries:	In hospital	229 — 85.4%		Foreskin tight (of boys)	40 — 31.3%
	At home	39 — 14.6%	Feeding:	Breast feeding	184 — 69.0%
Delivered by	Physicians	232 — 86.5%		At regular times	140 — 76.0%
	Non-professionals	26 — 9.7%		Supplementary and bottle feeding	125 — 46.8%
	Unassisted	10 — 3.7%		At regular times	80 — 64.0%
Defects:	Discharging eyes	4 — 1.9%	Irregular bowel movements		45 — 16.8%
	Skin and scalp (mostly heat rashes)	55 — 20.5%	Average weight at birth		7.5 lbs.

The Infant Welfare Service of the Lamont Health District supplies an urgent need in this community and should result in better nutrition of infants, decreased incidence of intestinal infection, and increased attention to prenatal and postnatal care for the mothers. It provides an index of the medical facilities available and used in this District.

Canadian Journal of Public Health

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MAGNITUDE OF THE PROBLEM OF PREVENTION

THE emphasis given to preventive medicine in proposed health service plans is entirely justified, but the manner in which this aspect is sometimes presented may suggest to the public that the day is close at hand when a very large part of the volume of sickness will be prevented and all mortality postponed until the useful span of life is past and old age finds death as a welcome release. The task, however, is not easy. It is only too well realized by those engaged in public health that the road to any such Utopia is a long one and that there are still many obstacles on the way. It is well to keep this in mind, not to serve as obstruction or inhibition to change, but as reason and incentive for further effort. Taking a lesson from the present world conflict, it behooves those who are interested and informed in public health to hold fast to facts. True enlightenment of the public regarding the problem should in itself be the strongest stimulus to instituting corrective measures. Good performance will then gain most effectual support. Misconceptions in regard to the ease of solution of the problem should not be allowed to deceive either ourselves or the public. While in the past, great advances have been made in preventive and curative medicine, and the expectancy of life has increased most gratifyingly, the problem still remains one of staggering proportions and difficulties.

It is to be remembered, for instance, that the age groups under 70 still* contribute well over half of all our deaths; that the age group under 60 supplies over a third of all our deaths and the age group of 1 - 49—even after excluding the infant deaths—contributes 15 to 20 per cent of our total mortality; that violence and accidents stand in first place as a cause of death in the age group of 1 - 39 years; that tuberculosis still ranks next to violent and accidental deaths in the whole age group of 15 - 39 and stands in fourth place in the 10 - 14 and 40 - 49 age groups; that respiratory infections and gastro-intestinal infections stand among the chief causes of death in childhood, as do rheumatic fever and appendicitis in adolescence and early adult life.

*1940.

While, in some of these causes, there has been already a significant reduction, the fact that they still rank high in important age groups of life shows clearly that the conquest is by no means complete. There is still a large problem in each.

We must remember, too, that in so far as morbidity in concerned, the paucity of data is humiliating. Apart from incomplete notification of communicable disease, such records of industrial medicine as are available, records of some of the medical services provided during the depression, records of occasional but not entirely representative surveys that have been made from time to time, and data from other countries, we have little factual information in regard to causes or extent of the problems of morbidity, which in fact bear little numerical relationship to problems of mortality. Before any promises for prevention are given, the problem of morbidity must be clearly defined and its extent and causes must be established. Estimates based on the data at hand do not form a sound basis from which plans of control might be drawn.

The public is always appreciative of the truth even if it is unpalatable. It is better that we should freely admit our limitations and confess our inabilities than allow any claims or promises unwarranted by facts.

THE CONTROL OF TUBERCULOSIS

FROM an unrivalled experience, Dr. George Ferguson reviews in this issue the basic principles of tuberculosis control and the changing tactics that have been necessary in the application of these principles to constantly changing conditions. Beginning with care of the sick and isolation of advanced cases, tactics have added successive case-finding methods and mass radiography, at a cost eminently practical for general use. To these is now added the trial use of vaccination. Dr. Ferguson's final appraisal of the value of vaccination in the prevention of tuberculosis, and the indications for such vaccination, will be awaited with intense interest. If the appraisal is favourable, its application will be influenced by various considerations, particularly in regard to the incidence of infection and the hazard of exposure. In many of the provinces of Canada, the incidence of infection in adults is no longer wide-spread but involves only a minority. The final appraisal of the value of vaccination cannot be made immediately. It is for the future. But in the meantime it is well to keep in mind that the conquest of tuberculosis is far from complete. Tuberculosis ranks in Ontario next to violence and accidents as a chief cause of death in the age group of 15 - 39, and occupies fourth place in the 5 - 14 and 40 - 49, third in the 5 - 9, and fifth in the 1 - 4 age groups; it still takes a significant toll in infancy and in older age, where it is obscured in numbers by the mass of death due to other causes. Bright as the future appears, it can only be so if the steady decline in the incidence and mortality is maintained. For this there must be, as Dr. Ferguson points out, continuous and increased effort and a constant search for new ways and means of applying basic principles.

Books

Hospital Discharge Study. *An analysis of 576,623 patients discharged from hospitals in New York City in 1933. By Neva R. Deardorff, Ph.D., and Marta Fraenkel, M.D. Volume II, Hospitalized Illness in New York City. Published by the Welfare Council of New York City (44 East 23rd Street), 1943. 349 pages.*

THIS is the second of a series of three volumes covering the findings of a study of over half a million patients discharged from hospitals in New York City in 1933. A great fund of information was available for analysis, and while by no means can all of it be published, many of the basic facts at least are being made available for study in these publications. Volume I dealt with the general demographic aspects of the problem of hospital care and the technique employed in the collection of data. Volume III will be devoted to a consideration of the application of techniques employed in the New York study to hospital morbidity reporting on a routine basis. The present volume focuses attention upon hospital performance in respect to patients with specific conditions and the service received by patients with various ailments.

Dividing patients into three main categories: obstetric, acute and chronic —the material for discussion has been selected with a view to directing attention to diseases and conditions presenting problems and controversial issues as to hospital care. Included in this volume are sections on type of hospital service, obstetrical service, service for operative and traumatic conditions and other acute conditions, and service for non-surgical chronic conditions. Special chapters in the various sections are devoted to the care of cancer patients, communicable diseases, appendicitis, pneumonia, diabetes, rheumatic and arthritic conditions, and cardiovascular disorders.

While a tremendous amount of factual information is included within the covers of this volume, and a great wealth of statistics comprehended in the 108 tables which are included, the authors do not draw any conclusions as to the adequacy of hospital resources, the use or place of convalescent hospitals or the need of specialization in hospital care. The authors have made, however, a most valuable contribution in providing a background of information for the review of present and for planning of future hospital facilities and in pointing out the additional facts required both in respect of present performance and in planning for the future.

A great deal of thought and study of the data collected in this and the companion volumes of this investigation is suggested on the part of the profession in general, and by hospital administrators, government hospital authorities and public health workers in particular. To say the least, a strong beginning has been made in a field long dormant—in a field where much work remains to be done and where many vital problems await solution. If arbitrary decisions are to be avoided in guiding future policy in respect of plans for hospital care, further studies such as the one reported upon should be made on an even broader basis in other areas. The authors have made an important contribution to public health.

A. H. Sellers